

INGRES



Getting Started with
Ingres and PHP
April 8th 2008
grantc@php.net

Abstract

From downloading the source code to building the Ingres PECL extension, this session covers what is needed to get started with Ingres and PHP

Agenda

- **What is PHP?**
- **Driver Status**
- **New Features**
- **Building and Installing the Driver**

Agenda

- **Code Examples**
- **Troubleshooting**
- **Driver Futures**
- **Submitting Changes**

What is PHP?

- **PHP: Hypertext Preprocessor**
 - Created in 1994 by Rasmus Lerdorf
 - Dynamic scripting language
- **Allows for rapid application development**
- **Mixed C, Java, Perl syntax**
- **Features support for some OO constructs**
- **No API for native DB drivers**
 - PDO is trying to address this

Driver Status : Then

- **Started by David Hénot in 2000**
- **First released in PHP 4.0.3**
- **Attempts to contact the original author failed**
- **Basic functionality**
 - `ingres_connect()`, `ingres_pconnect()`
 - `ingres_query()`
 - `ingres_commit()`, `ingres_rollback()`
 - `ingres_fetch_*()`
 - `ingres_field_*()`

Driver Status : Then

- **Missing support for...**
 - Parametrized queries
 - Cursors
 - Error reporting
 - BLOB handling
 - Unicode
- **Support for Linux, UNIX and Windows**
 - Where ever Ingres and PHP are available

Driver Status : Now

- **Currently maintained by Grant Croker**
 - grantc@php.net / grant.croker@ingres.com
- **Took over in 2005**
- **Now a PECL module**
 - <http://pecl.php.net/project/ingres>
 - Moved from core (php-src) due to a naming conflict
 - Release schedule is not tied to PHP

New Features - Summary

- **Implemented most of the missing functionality**
 - BLOB (LONG BYTE)
 - CLOB (LONG VARCHAR)
 - NCHAR/NVARCHAR
 - UTF-8/UTF-16
 - Parametrized Queries
 - Error reporting
 - Cursors

New Features - Summary

- Bi-directional scrolling cursors
 - Allows for row positioning
- BIGINT, INT8 (8 byte integer)
 - No equivalent type in PHP
 - Values outside of INT4 returned as string
 - PECL big_int can be used for manipulation
- Multiple concurrent result sets
 - `ingres_query()` generates result resource
- Added support for OpenVMS, PHP 4.3.10
 - http://community.ingres.com/wiki/PHP_and_Ingres_on_VMS

New Features - Parameters

- **passed as a PHP array to `ingres_query()`**
 - `ingres_query($link, $sql, $param_array)`
- **tries to determine Ingres type from PHP type**
- **String “10” is not the same as Long 10**
 - Within the current Ingres implementation
- **Up to Ingres 2006 no implicit coercion**
 - Available from Ingres 2006 Release 2, 9.1.0

New Features – Compatibility

- **Not backwards compatible with 1.4.3**
 - Change in the order of parameters
 - \$link and \$result are mandatory parameters
 - except for error reporting functions
- **./configure –enable-ingres2**
 - build generates ingres2.so
 - ingres_XXX becomes ingres2_XXX
 - ditto for ini settings
- **Build broken for Windows – fix pending**

New features - Parameters

- **Array keys needed when calling procedures**
 - key values need to match the parameter name in the procedure

New Features - Parameter Typing

- **5 PHP types**
 - STRING, LONG, DOUBLE, NULL, BOOL
 - RESOURCE, OBJECT not handled
- **13+ Ingres types**
- **Binary data kept in STRING**
 - no way to know variable contains binary data
- **Need to tell Ingres what you are giving it**
 - At least for now

New Features - Parameter Typing

- **Optional 4th parameter to `ingres_query()`**
- **String of parameter types**
 - b - BYTE
 - B - LONG BYTE
 - c - CHAR
 - d - DATE
 - D - DECIMAL
 - f - FLOAT
 - i - INTEGER
 - n - NCHAR
 - N - NVARCHAR
 - t - TEXT
 - T - LONG TEXT
 - v - VARCHAR
 - V - LONG VARCHAR

For example

- “vN”
 - VARCHAR, NVARCHAR

New Features - Parameter Typing

- **Needed for certain types where no PHP equivalent exists**
 - UNICODE
 - BLOBS
 - DECIMAL
 - DECIMAL != FLOAT
- **UNICODE data expected to be in UTF-16**
 - set `ingres.utf8` to `TRUE` to have the driver convert

Building and Installing

- **Getting the extension**
 - Windows
 - http://pecl4win.php.net/ext.php/php_ingres.dll
 - Pick the DLL according to the PHP version you are using
 - Frequent rebuilds based on CVS code
 - UNIX/Linux
 - <http://pecl.php.net/get/ingres>
 - Latest code is in CVS

Building - Windows

- **Not for the feint of heart**
- **See <http://php.net/manual/en/install.windows.building.php> for the prerequisites**
- **Need Microsoft C++ compiler**
 - <http://msdn.microsoft.com/vstudio/express/visualC/default.aspx>
- **contact grant.croker@ingres.com if you are interested**

Building - UNIX/Linux

- **Standard PHP build environment**
 - Linux distributions require a separate dev package
 - Novell SLES/openSuSE – php5-devel
 - RedHat ES/Fedora – php-devel
 - Debian/Ubuntu - php-dev
- **Needs flex, bison, autoconf, automake, libtool**
- **Should build using the latest GCC compiler (4.x)**

Building - UNIX/Linux

- **Load Ingres environment**

```
source ~ingres/.ingIIcsh # csh, tcsh  
. ~ingres/.ingIIbash # sh, ksh, bash
```

- **Generate configure script**

```
phpize
```

- **Execute configure script**

```
./configure --with-ingres
```

- **Build - finally...**

```
make
```

Installing - Windows

- **copy php_ingres.dll to *extension_dir***
- **add to php.ini**
 - extension=php_ingres.dll
- **II_SYSTEM needs be defined at the system level**
- **Web server process owner must be a valid Ingres user**
 - IIS 5.x - IUSR_<PCNAME>
 - Apache - SYSTEM or whoever the service runs as

Installing - UNIX/Linux

- **copy `ingres.so` to *extension_dir***
- **run `make install`**
 - may need root access
- **add to `php.ini`**
 - `extension=ingres.so`
- **Web server process owner must be a valid Ingres user**
 - Apache - Check *User* directive in `httpd.conf`

Apache set-up

- **Setting up Apache**
 - mod_env needs to be loaded
 - Need PassEnv/SetEnv for Ingres Environment
 - Add following to relevant Apache config file
 - PassEnv II_SYSTEM
 - PassEnv LD_LIBRARY_PATH
- **Make sure the Ingres environment is defined**
- **Ingres connection limit vs. Apache threads**

First PHP Page

- **Are PHP and the Web Server working?**
- **Does the Ingres extension load?**
- **Save the following as info.php in DocumentRoot**

```
<?php  
    phpinfo();  
?>
```

- <http://localhost/info.php>

First PHP Page - Output

PHP Version 5.2.5



System	Linux esva-suse 2.6.22.17-0.1-default #1 SMP 2008/02/10 20:01:04 UTC i686
Build Date	Feb 1 2008 17:34:23
Configure Command	'./configure' '--enable-maintainer-zts' '--enable-debug' '--with-apxs2=/usr/sbin/apxs2-prefork' '--with-config-file-scan-dir=/usr/local/lib/php/conf.d' '--with-zlib' '--with-unixODBC=shared,/usr' '--enable-pdo=shared' '--with-pdo-sqlite=shared' '--with-sqlite=shared' '--with-ldap' '--with-curl' '--with-mysql' '--with-mysqli'
Server API	Apache 2.0 Handler
Virtual Directory Support	enabled
Configuration File (php.ini) Path	/usr/local/lib
Loaded Configuration File	(none)
Scan this dir for additional .ini files	/usr/local/lib/php/conf.d
additional .ini files parsed	/usr/local/lib/php/conf.d/ingres.ini

First PHP Page – With Extension

ingres

Ingres Support	enabled
Ingres Extension Version	2.0.0
Revision	\$Revision: 92 \$
Ingres OpenAPI Version	6
Active Persistent Links	0
Active Links	0

Directive	Local Value	Master Value
ingres.allow_persistent	On	On
ingres.array_index_start	1	1
ingres.auto	On	On
ingres.blob_segment_length	4096	4096
ingres.cursor_mode	0	0
ingres.default_database	<i>no value</i>	<i>no value</i>
ingres.default_password	<i>no value</i>	<i>no value</i>
ingres.default_user	<i>no value</i>	<i>no value</i>
ingres.max_links	Unlimited	Unlimited
ingres.max_persistent	Unlimited	Unlimited
ingres.report_db_warnings	On	On
ingres.reuse_connection	On	On
ingres.scrollable	On	On
ingres.timeout	-1	-1
ingres.trace	Off	Off
ingres.trace_connect	Off	Off
ingres.utf8	On	On

First PHP Page – No Extension?

- **Get a listing of modules from PHP**

```
php -m
```

- **If no ingres module is listed check to see if php.ini contains correct extension entry for ingres**
 - extension=ingres.so ; UNIX/Linux
 - extension=PHP_INGRES.EXE ;VMS
 - extension=php_ingres.dll ;Windows

Connecting to Ingres

```
$link = ingres_connect ('demodb', 'user', 'password');

if ( ingres_errno($link) != 0 ){
    die ('Error - ' . ingres_errno($link) . ':' .
        ingres_error($link));
}

// do stuff..

ingres_close($link);
```

- Use *ingres_pconnect()* for persistent connections

Code Example – A Simple Query

```
$link = ingres_connect ('demodb', 'ingres', 'ingres');

$src = ingres_query ($link, "select * from user_profile
    where up_first = 'Grant'");

$profile_no=0;

while ($profile=ingres_fetch_object ($link))

{
    echo 'Profile $profile_no<BR/>\n';
    echo $profile->id.'<BR/>\n';
    //etc
}
```

Result

Name Grant Croker

Email grantc@php.net

Airport Code MAD

Code Example – Displaying Images

```
// Following currently required for Ingres 2006 R3

ini_set('ingres.scrollable', FALSE);

$sql = "select up_image where up_id = ?";

$params["up_id"] = $_GET['id'];

$result = ingres_query($link, $sql, $params);

$profile = ingres_fetch_object($result);

Header("Content-type:image/jpeg");

echo $profile->up_image;
```

Code Example – Displaying Images

- **Add a call to this script in the original profile page:**

```
<TR>  
  <TH>Photo</TH>  
  <TD>  
      
  </TD>  
</TR>
```


Result

Name Grant Croker

Email grantc@php.net

Airport Code MAD

Photo



Code Example – Updating a LOB

```
$handle = fopen ("grant.jpg", "r");  
  
$login_image = stream_get_contents ($handle);  
  
fclose ($handle);  
  
$sql = "update user_profile set up_image=? where  
      up_id=?";  
  
$types = "Bi"; // varchar, BLOB  
  
$params ["image"] = $login_image;  
  
$params ["up_id"] = "1021";  
  
$result = ingres_query ($link, $sql, $params, $types);  
  
ingres_free_result ($result);
```

Result

Name Grant Croker
Email grantc@php.net
Airport Code MAD

Photo



Code Example – Executing a RPP

```
ini_set ("ingres.utf8", TRUE);

$sql = "execute procedure get_my_airports (?, ?)";

$params["ccode"] = "ES";

$params["area"] = "%";

$param_types = "nN";

$result = ingres_query($link, $sql, $params,
    $param_types);

while ($airport=ingres_fetch_object($result) ) {
    echo $airport->col1 . " " . $airport->col2 . " " .
        $airport->col3 . "<BR/>\n";
}
```

Result

Airport Code	Location	Name
BCN	Barcelona	El Prat De Llobregat
MAD	Madrid	Barajas
VLL	Valladolid	Valladolid

Even more examples

- **Ingres Community Wiki**

http://community.ingres.com/wiki/PHP_Driver_Examples

- **tests directory**

- testxxx.phpt
- '--FILE--' section contains the example code

Troubleshooting

- **PHP error logging**
 - `error_reporting(E_ALL); // use for debugging only`
 - `ini_set('display_errors', FALSE);`
 - `ini_set('error_log', '/var/log/php.log');`
 - `ini_set('log_errors', TRUE);`
- **Ingres error reporting functions**
 - `ingres.trace_connect`
- **OpenAPI tracing**
 - `II_API_TRACE=5 / II_API_LOG=/path/to/api.log`

Think you have found a bug?

- **Report the bug**
 - <http://pecl.php.net/bugs/report.php?package=ingres>
- **Provide**
 - PHP version
 - Ingres release(s) used
 - INGRES_EXT_VERSION
 - INGRES_API_VERSION

Think you have found a bug?

- **A short script that reproduces the problem.**
- **The list of modules you compiled PHP with**
- **Any other information unique or specific to your setup.**
- **Ingres INI configuration settings**
- **A stack dump – if possible**

Driver Futures

- **Virtual Node Management**
 - Create, Delete, Query
- **Batch query support**
- **LOB Locators**
 - Scrolling and LOBs at the same time
- **Describe Input support**
 - Automatic data type handling

Submitting Changes

The first steps for those wanting to help any open source project can be quite difficult. From reporting bugs, submitting fixes or new functionality, this presentation outlines the requirements for someone looking to provide assistance with the Ingres PECL extension.

April 16th, 2008 at 6am PST/5pm PST

<http://www.ingres.com/customers/vip-program.php>

Summary

- **What is PHP?**
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- **Building and Installing the Driver**

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- **Code Examples**
- **Troubleshooting**
- **Driver Futures**
- **Submitting Changes**